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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/694,565	10/27/2003	Anurag Gupta	CPCM:0010/FLE (210546)	2433

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EXAMINER	
MERKLING, MATTHEW J	
ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/694,565	GUPTA ET AL.	
	Examiner	Art Unit	
	Matthew J. Merkling	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10,12,13 and 47-78* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,12,13 and 47-78* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 October 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the bilinear flow characteristic as described in the specification on page 32. Applicant identifies Fig. 9A as an exploded view of the plug with a custom machined plug used to give bilinear behavior of the flow characteristic. As can best be seen in Fig. 9A, the portion below the seating area (small intermediate band in the plug) which defines the cross sectional area open to flow, is a curved portion that would not give a linear flow characteristic, let alone a bilinear characteristic.

Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to

37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 70 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 70 does not set out any limitations that can be understood from the instant claim or the parent claim. For purposes of this examination, claim 70 will be treated as a claim that does not further limit the parent claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-8, 12, 13, 47-53, 54-58, 60-64, 67-72, 74, 75 and 77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hess et al. (US 6,235,852) in view of Freisinger et al. (US 2002/0053652).

Regarding claims 1, 5, 13, 48-52, 54-57, 60-64, 67-71 and 75, Hess discloses a polyolefin production system (see title and abstract), comprising:

a loop polyolefin reactor (1) to polymerize olefin monomer in a reaction mixture to a solid polyolefin, wherein the reaction mixture comprises the olefin monomer, a catalyst, and the solid polyolefin (col. 2 lines 59-66), and wherein the loop polyolefin reactor (1) comprises an impeller to circulate the reaction mixture through the loop polyolefin reactor (see impeller in Fig. 1);

a temperature control system configured to control the temperature of the reaction mixture circulating through the loop polyolefin reactor, wherein the temperature control system provides a liquid coolant supply (via conduits 9') to a jacket (7 and 8) of the loop polyolefin reactor and receives a liquid coolant return from the jacket (via conduits 9"), the temperature control system comprising a temperature control valve (such as 19 or 27) disposed along a

conduit (such as 23 or 15 or 16) of the temperature control system to modulate a flow rate of a stream of liquid coolant;

a coolant pump (11 or 12) to supply liquid coolant to the reactor jacket and to receiver coolant from the reactor jacket; and

a heat exchanger (21) disposed downstream from the coolant pump to remove heat from a slip stream of the liquid coolant (see Fig. 1 where some coolant bypasses the heat exchanger) to remove heat from the liquid coolant (col. 3 lines 9-12).

While Hess discloses the use of a control valve to regulate the flow of coolant the polyolefin reactor jackets, Hess fails to teach specifically the type of valve that is used.

Freisinger discloses a control valve that is effective at controlling flow rates over a wide range (see abstract).

Freisinger teaches a control valve that has a bilinear flow characteristic (see Fig. 6C that illustrates a tri-linear flow characteristic, which inherently contains a bilinear flow characteristic). Freisinger discloses that this valve, which:

- demonstrates a bilinear flow characteristic, and
- has a body comprising a port (14, 16) with a seat (18) and a valve stem comprising a plug (see Fig. 8) disposed on one end of the stem, wherein the stem is moveable between a fully closed position and a fully open position (see Fig. 8 where valve is fully open, and Fig. 7 where valve is fully closed), and wherein the bilinear flow characteristic changes slope at less than 50% open position (see Fig. 6C);

is an effective means for controlling the flow rate over a wide range (in other words, has a very high turndown ratio, paragraph 159). Furthermore, it is generally known in the art that a common problem with control valves is having a low turndown ratio (paragraph 10).

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the bilinear flow characteristic valve of Freisinger, to the temperature control valve of Hess in order to obtain a high turndown ratio valve and effectively control the flow rate of the coolant over a wide range.

Regarding claim 7, Hess further discloses the temperature control system comprises one or more controllers configured to operate the temperature control valve (see multiple TCs in Fig. 2).

Regarding claim 12, Hess further discloses a motive device to drive an impeller which circulates said reactants (see motive device attached to loop reactor in Fig. 1).

Regarding claims 53 and 72, Hess further discloses multiple jackets around the polymerization reactors (see Fig. 1).

Regarding limitations recited in claims 2-4, 6, 8, 47, 57, 58, 74, 75 and 77 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP §2114 and 2115. Further, process limitations do not have a patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents

thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.

7. Claims 9, 10, 59, 65, 66, 76 and 78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hess et al. (US 6,235,852) and Freisinger et al. (US 2002/0053652) as applied to claims 1, 54, 63 and 69 above and further in view of Johnson et al. (US 5,697,436).

Regarding claims 9, 10, 59, 65 and 76, Hess, as discussed in claims 1, 54, 63 and 69 above, discloses a temperature control system for a polymerization reactor in which a coolant is used at a controlled rate to keep the polymerization reactor at a very specific temperature to produced the desired quantity and quality of polyolefin (col. 2 lines 13-22). Furthermore, Hess discloses a temperature controller that operates the coolant flow based on the temperature of the reactor (see Fig. 2 where valve 27 is controlled by a TC located inside the reactor).

Johnson also discloses a temperature control system for a polymerization reactor (col. 5 lines 36-47). Johnson gives a specific example where the temperature control system is used in a batch reactor system, but also discloses that said control system is advantageous in reactor systems where temperature control in important during operation (col. 6 lines 41-45).

Johnson teaches a master/slave controller configuration that comprises a master controller (30, which measures temperature inside the reactor) and a slave controller (32, which measures the temperature of the coolant). The

temperature control system of Johnson further teaches the slave controller (32) controlling cooling water flow through a cooler (24, or alternatively through a second heat exchanger, 22) and a flow control valve to regulate the quantity of coolant circulated through the system (see control diagram in Fig. 1). Johnson teaches several benefits from this temperature control system including:

- provides preferable steady state temperature control with no overshoot/undershoot (col. 6 lines 35-37);
- providing the operator with only one variable to control, which provides for easier operations (col. 6 lines 37-41); and
- economic savings in use of human resources, equipment utilization, and reduction in off-spec product.

As such, it would have been obvious to one of ordinary skill to incorporate the master/slave control system of Johnson, into the control system of Hess in order to provide for a more efficient process and more reliable product.

Regarding claim 78, Hess, as modified by Freisinger and Johnson, further teaches a third control valve (26) disposed along a third conduit (see Fig. 2).

Regarding limitations recited in claims 9, 10, 66 and 78 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP §2114 and 2115. Further, process limitations do not have a patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to

an intended operation are of no significance in determining patentability of the apparatus claim.

8. Claim 73 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hess et al. (US 6,235,852) and Freisinger et al. (US 2002/0053652) as applied to claim 69 above and further in view of Wu et al. (US 6,252,016).

Regarding claim 73, while Hess discloses a heat exchanger configured to transfer heat to and from a polymerization reaction coolant stream (as discussed above), Hess fails to explicitly disclose the type of heat exchanger used such as the claimed plate and frame heat exchanger.

Wu also discloses a heat exchanger that transfers heat to and from a polymerization reaction coolant (see abstract).

Wu teaches a heat exchanger to use in such a service is a plate and frame heat exchanger preferable due to the preferable heat transfer that is exhibited by this type of heat exchanger (col. 5 lines 1-18, and also see examples 1, 6 and 7 where a plate frame heat exchanger is utilized).

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the plate and frame heat exchanger structure of Wu, to the heat exchanger of modified Hess in order to provide preferable heat exchange to and from the polymerization reaction coolant.

Response to Arguments

9. Applicant's arguments with respect to claims 1-13 have been considered but are moot in view of the new ground(s) of rejection necessitated by amendment.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Merkling whose telephone number is (571) 272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MM

MJM

ALEXA D. NECKEL
SUPERVISORY PATENT EXAMINER